A MODULAR SYSTEM FOR REALIZING MOBILE MEANS OR STATIC MACHINES OPERATED BY HUMAN MUSCULAR STRENGTH

The present invention relates to a modular system for realizing human powered mobile means, for recreational or sport use, or static machines operated by human muscular strength.

More particularly, the present invention relates to a modular system for realizing mobile means or static machines comprising ergonomic operating means like pedals, handles, rolls or other mechanical devices, that may be operated by a substantially continuous and repetitive muscular movement, like push on a pedal, rowing or running.

Said mobile means may be boats, vehicles on wheels, sledges or other, and are usually used for purely recreational purposes, as funny alternative means of transport, or for physical exercises, with the advantage of doing so on open air.

Said static machines may be machines resting on the ground, comprising means for dissipating the movement produced by the user. Said machines are generally used for training or exercise, or even for muscular rehabilitation.

Pedal vehicles or tricycles are known, operated by the muscular strength of the driver's legs, or even small boats also operated by pedals like those used for short excursion near the coast.

A disadvantage of said mobile means and static machines consists in that they require the user to perform always the same movement, and they do not allow to modify the exercise or training and the muscular mass concerned.

This means that it is not possible to train different muscles, if not providing a plurality of different machines, which implies a problem of spaces and costs.

This disadvantage is such also for a sole recreational purpose, because it limits the variety of use and therefore the possibilities of amusement.

Another disadvantage consists in that said means and machines can not be used by people with motory difficulties nor by disabled persons, and generally it is not easy to quickly fit them for this purpose.

It is the aim of the present invention to solve the above mentioned inconveniences.

In particular, the aim of the present invention is to realize a modular system for mobile means or static machines for recreational and sport use, operated by the human muscular

strength, that allows to fit said machines in an easy and practical manner for working with a muscular movement variable according to the choice of the user. Therefore, it is the aim of the present invention to realize mobile means or machines for recreational and sport purpose particularly practical and funny in use, that may be used for different kinds of training or exercise, also by disabled or handicapped persons.

This and other purposes are reached by means of the present invention, consisting of a modular system for realizing mobile means that may be operated by the human muscular strength, or static machines, characterized in that it comprises modular elements provided with ergonomic operating means for being used by one or more persons, and a main frame, in which said modular elements may be selectively connected to said main frame, singularly or in a plurality, by means of reversible quick coupling means.

The main advantage consists in that, as the operating means are connected to modular elements that are interchangeable on the same main frame, the mobile means or the static machine may be easily fitted to be operated by different muscular masses.

A further advantage consists in the possibility of separating the modular elements from the main frame, so as to avoid the need of

protecting the whole machine or the mobile means from theft or damage.

Furthermore, in sport use for training the invention allows to fit a complete gymnastics with low costs and encumbrance.

A further advantage consists in that the present invention allows to realize mobile means or machines that may be fitted for use by disabled persons or by persons with motory handicaps, using modular elements specially designed for this purpose.

These and other advantages will be described more in detail hereinbelow, relating to the enclosed figures in which preferred embodiments are shown.

Figure 1 shows in a scheme an embodiment of the present invention, as used for realizing a pedal boat.

Figure 2 shows a scheme of another embodiment of the present invention, in which a modular structure according to the present invention is used for realizing a static machine.

Figure 3 shows another embodiment according to the present invention, showing a modular human powered boat.

Figures 4 and 5 show in a front and top view, a hull that may be used for realizing a boat similar to the one shown in figure 1.

Figures 6 and 7 show in a top view and in a longitudinal sectional view, a variant of the hull of figures 4 and 5.

Figure 8 shows a sectional view according to line VIII-VIII of figure 7.

Figures 9 and 10 respectively show a top view and a longitudinal sectional view of another way for realizing the hull of a modular boat according to the present invention.

Figure 11 shows a modular element according to the present invention.

Figures 12 and 13 show realization details of the modular element shown in figure 11, respectively in a lateral and front view.

Figure 14 shows details relating to the means connecting the modular element of figure 11 and the hulls of the boat of figure 1 or 3, or the base of the machine of figure 2.

Figures 15, 16, 17 and 18 show some examples of modular elements interchangeable with the one of figure 11, according to the present invention

Figure 19 shows an element similar to the one of figure 11, but that may be associated to the hull of figures 9 and 10.

Relating now to the details shown in the figures, the modular system according to the present invention mainly comprises modular elements 1a-1e that may be associated to a main frame 2 by means of reversible quick coupling means.

Modular elements 1a-1e mainly comprise a support platform 3 and ergonomic means to be operated by the human muscular strength, that will be described more in detail hereinbelow.

For the realization of a boat for recreational purposes like the one shown in figure 1 or 3, said main frame 2 comprises floating means advantageously consisting of a single hull structure or of a catamaran structure.

For realizing a mobile means of any other kind, according to the present invention, or a static machine for physical exercise, like the one of figure 2, said main frame 2 is advantageously realized with a tubular structure made of steel, aluminium or other

material, and is provided with wheels or other moving means, or even with simple supports on the ground.

Said reversible quick coupling means allow to selectively connect one or more modular elements 1a-1e, equal or different one from the other, to said main frame 2.
They advantageously consist of trolleys 4 that may be associated to said platform 3 of the modular elements 1a-1e, sliding along guides 5 fixed to said main frame 2.

Said guides 5 advantageously have a substantially T-shaped section, with two longitudinal grooves 6a and 6b; said trolleys 4 therefore are substantially C-shaped, with edges 7a and 7b sliding in said grooves.

For blocking said modular elements 1a-1e in a determined position on said main frame 2, said guides 5 comprise a plurality of references, e.g. holes 8, and said trolleys 4 comprise blocking means for cooperation with said references, e.g. pins 9 with a return spring, or equivalent means like screws, nuts, 'velcro'.

For allowing to connect different modular elements 1a-1e to the same main frame 2, modular elements will be advantageously realized having different shapes or dimensions, with different operating means, but having trolleys 4 at the same distance one

from the other and having the same shape and dimension, so as to properly fit with said guides 5 of said main frame 2.

The trolleys 4 may be fixed to the modular elements 1a-1e or permanently inserted in the guides 5 and fixed to said modular elements by means of reversible connecting means like screws, nuts or equivalent.

In a preferred embodiment of the present invention, said trolleys 4 and said guides 5 are of the kind used on sailboats for regulating the point of sheet.

In another embodiment of the invention, the main frame 2 comprises housings 10 and the platform 3 of the modular elements 1a-1e comprises a base 11 that may be inserted and blocked in one of said housings 10.

Advantageously, said base 11 has unified dimensions for the different modular elements 1a-1e, so as to make possible the interchangeability of said elements on the main frame 2.
The dimensions preferred for said base 11 are of about 50 x 25 x 5 cm. The blocking of said base 11 in one of said housings 10 will occur by known mechanic means.

Said base 11 connects the modular elements 1a-1e to the main frame 2 and therefore it may have different shapes and dimensions.

Another suitable system to connect the modular elements 1a-1e to the main frame 2 consists in a spring blocking and release mechanism like those used, for example, on ski boots.

The main frame 2 may be realized in such a way as to connect to the same a single element in turn, among said modular elements 1a-1e, or even two or more modular elements, equal or different one from the other. This possibility will be obtained, for example, with a plurality of guides 5 disposed on parallel lines, single or in couples, or with a plurality of housings 10.

The modular elements 1a-1e, singularly shown in the enclosed figures, show different ways of realizing a modular element that may be associated to said frame 2, according to the present invention, and the operating means therefore respectively comprise a couple of pedals 20 associated to a fly-wheel 22, like those of a common bicycle; a traction handle 22 fixed to a chain 23, and a sliding seat 24, so as to simulate rowing; a couple of boards 25 that can be operated by an alternate movement like the one performed when climbing steps, like in the so-called 'step' simulators; a tapis roulant 26 that may be operated with a walking or running movement; a seat 27 and a couple of fly-

wheels 28, lateral to the seat, that may be operated with a push of the arms and that therefore may be used also by persons with disability at their legs.

These embodiments are described for exemplifying and not limiting purposes, as it will be possible to realize modular elements essentially similar to those shown and interchangeable with them, but comprising any other known kind of seat, handle, lever or other means or mechanism that allows the use and the operating by one or more persons, with a certain muscular movement.

Modular elements 1a-1e also comprise known mechanisms, that can transform the muscular movement of the user into a rotation movement. Said mechanisms will be realized, for example, like those of gymnastic machines, like bicycles, rowing ergometers, 'tapis roulants' and other similar machines or simulators.

The rotation movement produced in this way is transmitted to propulsion means 30, as for example in the boat of figure 1, or to dissipating means 31, as in the static machine of figure 2.

Said propulsion means 30 are of known kind and adapted to propulsion on water or ground. It is evident that mechanical, electrical, hydraulic or pneumatic mechanisms, necessary for their functioning, will be associated to the same.

Advantageously, a system for the variation and regulation of the effort is associated to said dissipating means 31, like a fly-wheel provided with ad adjustable brake of a conventional mechanical type or even of magnetic or hydraulic type.

Propulsion means 30 or dissipating means 31 may be associated to the main frame 2 or directly to the modular elements 1a-1e, as in the embodiment shown for example in figure 3.
These two embodiments are equivalent, and will be chosen according to practicalness and economic convenience, and according to the use.

If said propulsion means 30 or dissipating means 31 are associated to the main frame 2, said frame and the modular elements 1a-1e comprise transmission means, reversibly connected one to another and advantageously consisting of a motor pulley 40 and a driven pulley 41 that may be mechanically connected with a transmission belt 42.

The motor pulley 40 is preferably in a position unified for different modular elements, to facilitate the interchangeability of the modular elements.

The motor pulley 40 is connected to the operating means, so that the movement of said operating means puts into rotation the pulley 40.

In another embodiment, as shown in the figures, the platform 3 of modular elements 1a-1e comprises a support 43 for a shaft onto which said motor pulley 40 and another pulley 44 are fitted, the latter being connected to the operating means of the modular elements by means of a belt 45 or similar.

For allowing the connection of a plurality of modular elements at the same time and on the same main frame 2, said frame may comprise multiple connection means, e.g. a plurality of driven pulleys 41, fitted onto the same shaft.

A preferred use of the present invention is the realization of boats for recreational purpose.

In this case, the main frame 2 comprises floating means. Preferably, it has a catamaran structure with two hulls 50a and 50b, connected by a platform 51 to which guides 5 are fixed.

The hulls 50a and 50b may also be connected by beams 52 supporting a frame 53, advantageously in metal structure or metal box, to which said guides 5 are fixed.

Obviously, it is also possible to realize the main frame 2 as a common single hull; furthermore, said platform 51 may comprise housings 10 instead of guides 5.

In this realization of the present invention, propulsion means 30 comprise a propeller or a wheel provided with blades, for generating a hydrodynamic thrust by its own rotation, or even a water jet propulsor. Furthermore, the main frame 2 may also be provided with means for the installation of known sailing or rowing devices.

It is evident that if the invention is used for realizing mobile means or vehicles of any kind, they will comprise directing means like a steering wheel or gear.

The functioning and the use of the system according to the present invention are the following.

The user choose the modular element he wants to use, e.g. one of the modular elements 1a-1e, according to the training or exercise to perform, or simply according to his preferences.

As mentioned above, a single modular elements or a plurality of modular elements 1a-1e, equal or different one from the other, may be connected to the same main frame 2, depending on how said main frame 2 is realized.

The present invention therefore may be used by one person or by a plurality of persons at the same time, in the latter case by means of different modular elements, connected to the same

main frame 2, or by means of a single modular element usable by a plurality of persons, like a tandem.

For connecting one of the modular elements 1a-1e to the main frame 2, the user slides the trolleys 4, fixed to the platform 3 of the modular element, along the guides 5 to the desired position. When the position is reached, he blocks the trolleys 4 inserting pins 9 into corresponding holes 8 on guides 5.

If the propulsion means 30 or the dissipating means 31 are associated to the main frame 2, the user connects the transmission means respectively associated to the modular element and to the frame, e.g. he connects the pulleys 40 and 41 by means of a belt 42.

After the use, it is possible to separate the main frame 2 from the modular element or elements 1a-1e.
This is useful to prevent thefts or for preventing said modular elements from being exposed to bad weather, and it is particularly advantageous for the embodiment shown in fig. 3, in which the most delicate components, like propulsion means 30 and their mechanisms, are associated only to the modular element 1a.

In other embodiments, other means may be used, substantially equivalent to those described and per se known, for the blocking

of the trolleys 4 or for the connection of the modular elements 1a-1e to the main frame 2.

It is evident that monitoring devices may be connected to the modular elements 1a-1e, such as sensors for the heartbeat of the user, a chronometer, a meter for the –real or virtual - distance run, electronic or computerized devices that will allow a determined training or to choose predetermined training programmes, or even other devices to make the use more functional or funny.

1. A human-powered mobile means, characterized in that it comprises a main frame (2) and at least one modular element (1a-1e), said modular element (1a-1e) being adapted to accommodate at least one user, provided with ergonomic operating means, and connectable to said frame (2) by means of reversible, quick coupling means (4, 5, 8, 9), thus being interchangeable with further modular elements (1a-1e).